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AIR QUALITY EMISSIONS CONFORMITY ANALYSIS

On The Supplement To The 1993 Metropolitan Transportation Plan

And On

Amendment 93-9 To The FY 1992/93 Federal Transportation Improvement Program

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Sacramento Area Council of Governments

April 29, 1994

Federal regulations require that SACOG perform an Air Quality Conformity Analysis on our transportation plans and programs. The purpose is to ensure that our plans and programs "conform" to all applicable federal air quality requirements. Based on guidance from the Environmental Protection Agency (EPA) dated November 24, 1993, this conformity analysis must be based on the most recent estimates of on-road vehicle-based emissions. The emissions estimates must be based upon the most recent population, employment, travel and congestion forecasts from SACOG, acting as the federally designated metroplitan planning organization (MPO) for the Sacramento region.

SACOG has developed an emission conformity procedure based on these requirements. We develop a series of forecasting model runs, using our SACMET travel demand forecasting model. The model uses estimates of population, employment and travel patterns for 1990, as the "Base Year," and future estimates of these same paramters for a series of future years. The future years are designated as "milestone" or "horizon" years for certain types of pollutant emissions, under EPA regulations. The SACMET model is used to estimate daily vehicle miles traveled (VMT), in five-mile-per-hour increments, for each model run. The total number of trips for each model run is also generated. Daily VMT and total trips from each model run are then used as inputs to our vehicle-emissions forecasting model, DTIM (Direct Travel Impact Model). The DTIM model forecasts emissions based on the travel-related forecasts from the SACMET model.

This report shows the emissions analysis results. The full, final Air Quality Conformity Analysis package will include additional background materials and technical documentation. **Section 1** of this report, starting on page 2, deals with the emissions analysis on the Supplement to the '93 Metropolitan Transportation Plan. **Section 2**, starting on page 6, deals with the emissions analysis on the Amendments to the FY 1992/93 Federal TIP (Amendment 93-9).

Section 1. Emissions Analysis on the Supplement to the 1993 Metropolitan Transportation Plan.

The following table shows the twenty-three (23) model runs and pollutants that were analyzed by SACOG for this emission conformity analysis on our Supplement to the 1993 Metropolitan Transportation Plan.

Pollutant	Year	Model Runs
Ozone (TOG & NOx)	1990 Base Year	Base Year
	1996 Milestone Year	No Plan and Plan
	1999 Milestone Year	No Plan and Plan
	2005 Horizon Year	No Plan and Plan
	2015 Horizon Year	No Plan and Plan
Carbon Monoxide (CO)	1990 Base Year	Base Year
	1995 Milestone Year	No Plan and Plan
	2005 Horizon Year	No Plan and Plan
	2015 Horizon Year	No Plan and Plan
Particulate Matter (PM-10)	1990 Base Year	Base Year
	2000 Milestone Year	No Plan and Plan
	2005 Horizon Year	No Plan and Plan
	2015 Horizon Year	No Plan and Plan

The "No Plan" model networks include the transportation system as it existed in 1993 (the 1990 Base Year network plus any additions or improvements to the network that were actually built or implemented through the end of 1993). No other improvements or additions to the network are assumed for any of the future-year "No Plan" model runs.

The "Plan" networks include all transportation improvements -- regardless of funding source -- shown in the 1993 Metropolitan Transportation Plan and in the Draft Supplement to that plan, based on the listed years for each of those improvements. The SACMET model then generated daily vehicle miles traveled (VMT) and total trips for each of the above model runs. These results were used as input into the DTIM emissions forecasting model. The results of the DTIM emissions analysis are shown in the table on the following page.

EMISSIONS FORECASTS: DRAFT SUPPLEMENT TO THE 1993 METROPOLITAN TRANSPORTATION PLAN

SHOWING COMPARISONS OF:

1) 1996 Total Organic Gas ("TOG") and Nitrogen Oxide ("NOx") Emissions From The 15-Percent Rate-Of-Progress Plan;
2) Total Organic Gas ("TOG") and Nitrogen Oxides ("NOx") Emissions For Years 1996, 1999, 2005, And 2015;
3) Carbon Monoxide ("CO") Emissions For Years 1990, 1995, 2005, And 2015; And
4) Particulate Matter ("PM-10") Emissions For Years 1990, 2000, 2005, And 2015

EMISSION CATEGORY	TONS PER DAY OF EMISSIONS							
	1990 BASE YEAR	1995		15 PERCENT ROP	1996		1999	
		NO PLAN	PLAN		NO PLAN	PLAN	NO PLAN	PLAN
TOG NOx	60.64 98.15	NA NA	NA NA	56.81 86.12	42.77 81.23	42.53 81.13	39.52 80.95	38.53 80.56
CO	760.41	590.04	582.96	NA	NA	NA	NA	NA
PM-10	103.38	NA	NA	NA	NA	NA	NA	NA

EMISSION CATEGORY	TONS PER DAY OF EMISSIONS					
	2000		2005		2015	
	NO PLAN	PLAN	NO PLAN	PLAN	NO PLAN	PLAN
TOG NOx	NA NA	NA NA	29.76 77.87	28.43 76.88	26.27 86.02	23.62 83.01
CO	NA	NA	366.44	351.43	342.04	306.42
PM-10	159.96	158.77	199.52	194.04	271.42	252.66

"NA" means Not Applicable (forecast for that emission category not required for that year).

The following paragraphs discuss the results in light of specific emissions tests we must meet to determine conformity for our Supplement to the 1993 Metropolitan Transportation Plan.

1996 "TOG" and "NOx" Less Than 15-Percent Rate-Of-Progress Plan
The table shows emissions of total organic gas ("TOG") and nitrogen oxides ("NOx") for the 1996 "Plan" are less than the emissions forecast in the 15-Percent Rate-of-Progress Plan for 1996. This is a key conformity test we must pass.

TOG and NOx Less In Future, And Less In "Plan" Than In "No Plan"
The table shows that total organic gas and nitrogen oxides ("NOx") emissions are forecast to be significantly lower in the future when compared against the 1990 Base Year. Also, both TOG and NOx emissions for the "Plan" are forecast to be lower than for the "No Plan" scenario for each of the milestone and horizon years. Both tests must be met for a conformity finding.

CO Less In Future, And Less In "Plan" Than In "No Plan"
Carbon monoxide ("CO") emissions are forecast to be significantly lower in the future than they were in 1990, and lower for the "Plan" scenario than for the "No Plan" in each of the milestone and horizon years. These also are prerequisites for a conformity finding.

PM-10 Less In Future, Or Less In "Plan" Than In "No Plan"
The last emission category in the table is for particular matter ("PM-10", meaning dust that is 10 microns in width or smaller). The table shows that PM-10 emissions are projected to increase significantly from the 1990 Base Year. The reason for the dramatic increase in PM-10 emissions in the future is the methodology used to develop these estimates. The EPA's PM-10 forecasting methodology ("AP-42"), which we use, relies solely on daily VMT, and daily VMT is projected to increase significantly in the future. As daily VMT increases, so will PM-10, using EPA's methodology. However, the conformity test for PM-10 requires that either of two tests be met: either the "Plan" results in less emissions than the "No Plan" scenario in future years, or the future emissions are less than the 1990 Base Year levels. In our case, the "Plan" yields less PM-10 emissions in the future than the "No Plan" scenario, so one of the two tests is met.

CONCLUSIONS: Emissions analysis of the Draft Supplement to the 1993 Metropolitan Transportation Plan finds that the Draft Supplement meets the emissions test for a conformity finding. The supplement would result in TOG and NOx emissions that are less than the budgeted levels in the 15-Percent Rate-Of-Progress Plan for 1996. The supplement also brings a reduction of TOG, NOx, and CO emissions compared to the 1990 Base Year emissions. The Draft Supplement also results in less emissions of these pollutants than the "No Plan" scnenario in all future years. Finally, the Draft Supplement results in less PM-10 emissions than the "No Plan" scenario in the future.

Section 2. Emissions Analysis on Amendment 93-9 to the FY 1992/93 Federal Transportation Improvement Program (Federal TIP).

The following table shows the twenty-three (23) model runs and pollutants that were analyzed by SACOG for this emission conformity analysis on Amendment 93-9 to the FY 1992/93 Federal Transportation Improvement Program.

Pollutant	Year	Model Runs
Ozone (TOG & NOx)	1990 Base Year	Base Year
	1996 Milestone Year	No TIP and TIP
	1999 Milestone Year	No TIP and TIP
	2005 Horizon Year	No TIP and TIP
	2015 Horizon Year	No TIP and TIP
Carbon Monoxide (CO)	1990 Base Year	Base Year
	1995 Milestone Year	No TIP and TIP
	2005 Horizon Year	No TIP and TIP
	2015 Horizon Year	No TIP and TIP
Particulate Matter (PM-10)	1990 Base Year	Base Year
	2000 Milestone Year	No TIP and TIP
	2005 Horizon Year	No TIP and TIP
	2015 Horizon Year	No TIP and TIP

The "No TIP" model networks include the transportation system as it existed in 1993 (the 1990 Base Year network plus any additions or improvements to the network that were actually built or implemented through the end of 1993). No other improvements or additions to the network are assumed for any of the future-year "No TIP" model runs.

The "TIP" networks include all transportation improvements -- regardless of funding source -- shown in Amendment 93-9 to the 1992/93 Federal TIP. The SACMET model then generated daily vehicle miles traveled (VMT) and total trips for each of the above model runs. These results were used as input into the DTIM emissions forecasting model. The results of the DTIM emissions analysis are shown in the table on the following page.

EMISSIONS FORECASTS: DRAFT AMENDMENT 93-9 TO FY 1992/93 FEDERAL TRANSPORTATION IMPROVEMENT PROGRAM

SHOWING COMPARISONS OF:

1) 1996 Total Organic Gas ("TOG") and Nitrogen Oxides ("NOx") Emissions From The 15-Percent Rate-Of-Progress Plan;
2) Total Organic Gas ("TOG") and Nitrogen Oxides ("NOx") Emissions For Years 1996, 1999, 2005, And 2015;
3) Carbon Monoxide ("CO") Emissions For Years 1990, 1995, 2005, And 2015; And
4) Particulate Matter ("PM-10") Emissions For Years 1990, 2000, 2005, And 2015

EMISSION CATEGORY	TONS PER DAY OF EMISSIONS							
	1990 BASE YEAR	1995		15 PERCENT ROP	1996		1999	
		NO TIP	TIP		NO TIP	TIP	NO TIP	TIP
TOG NOx	60.64 98.15	NA NA	NA NA	56.81 86.12	42.77 81.29	42.53 81.13	39.52 80.95	38.53 80.56
CO	760.41	590.04	582.96	NA	NA	NA	NA	NA
PM-10	103.38	NA	NA	NA	NA	NA	NA	NA

EMISSION CATEGORY	TONS PER DAY OF EMISSIONS					
	2000		2005		2015	
	NO TIP	TIP	NO TIP	TIP	NO TIP	TIP
TOG NOx	NA NA	NA NA	29.76 77.87	28.68 76.88	26.27 86.02	25.38 84.67
CO	NA	NA	366.44	354.01	342.04	329.76
PM-10	159.96	158.77	199.52	194.04	271.42	252.66

"NA" means Not Applicable (forecast for that emission category not required for that year).

The following paragraphs discuss the results in light of specific emissions tests we must meet to determine conformity for the Amendments to the FY 1992/93 Federal TIP.

1996 "TOG" and "NOx" Less Than 15-Percent Rate-Of-Progress Plan
The table shows emissions of total organic gas ("TOG") and nitrogen oxides ("NOx") for the 1996 "TIP" are less than the emissions forecast in the 15-Percent Rate-of-Progress Plan for 1996. This is a key conformity test we must pass.

TOG and NOx Less In Future, And Less In "TIP" Than In "No TIP"
The table shows that total organic gas and nitrogen oxides ("NOx") emissions are forecast to be significantly lower in the future when compared against the 1990 Base Year. Also, both TOG and NOx emissions for the "TIP" are forecast to be lower than for the "No TIP" scenario for each milestone and horizon year. Both of these tests must be met for a conformity finding.

CO Less In Future, And Less In "TIP" Than In "No TIP"
Carbon monoxide ("CO") emissions are forecast to be significantly lower in the future than they were in 1990, and lower for the "TIP" scenario than for the "No TIP" scenario for each milestone and horizon year. These also are prerequisites for a conformity finding.

PM-10 Less In Future, Or Less In "TIP" Than In "No TIP"
The last emission category in the table is for particulate matter ("PM-10", meaning dust that is 10 microns in width or smaller). The table shows that PM-10 emissions are projected to increase significantly from the 1990 Base Year. The reason for the dramatic increase in PM-10 emissions in the future is the methodology used to develop these estimates. The EPA's PM-10 forecasting methodology ("AP-42"), which we use, relies solely on daily VMT, and daily VMT is projected to increase significantly in the future. As daily VMT increases, so will PM-10, using EPA's methodology. However, the conformity test for PM-10 requires that either of two tests be met: either the "TIP" results in less emissions than the "No TIP" scenario in future years, or the future emissions are less than the 1990 Base Year levels. In our case, the "TIP" yields less PM-10 emissions in the future than the "No TIP" scenario, so one of the two tests is met.

CONCLUSIONS: Emissions analysis of Amendment 93-9 to the 1992/93 Federal Transportation Improvement Program finds that the TIP Amendment meets the emissions tests for a conformity finding. The TIP amendment results in TOG and NOx emissions that are less than the budgeted levels in the 15-Percent Rate-Of-Progress Plan for 1996. The TIP also brings a reduction of TOG, NOx, and CO emissions compared to the 1990 Base Year emissions. The TIP results in less emissions of these pollutants than the "No TIP" scnenario in all future years. Finally, the TIP results in less PM-10 emissions than the "No TIP" scenario in the future.

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